IMAGINING the possibilities. MAKING THEM HAPPEN.

Indiana Department of Education

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ISTEP+: Grade 8

Mathematics

Released Items and Scoring Notes

Introduction

Indiana students in Grades 3-8 participated in the *ISTEP+* Spring 2014 administration. The test for *ISTEP+* in Spring 2014 consisted of an Applied Skills section administered in March and a Multiple-Choice section administered in late April and early May. For all grades, the Applied Skills section of the assessment was handscored by trained evaluators. The Multiple-Choice section was machine-scored. Scores for the Applied Skills and Multiple-Choice sections are combined to generate a student's total score.

Test results for both the Multiple-Choice and Applied Skills sections, as well as images of the Applied Skills student responses, are available online. It is the expectation of the Indiana Department of Education that schools will take this opportunity to have a conversation with parents and students about the results. As a springboard for this conversation, the Indiana Department of Education has created this document which outlines the released Applied Skills questions and includes brief scoring notes that describe the given score points and explain the scoring rules and expectations for the individual questions.

This document consists of:

- a brief description of the types of questions assessed
- a short summary of scoring rules utilized by the trained evaluators
- access to rubrics used to score student responses
- a copy of the released Applied Skills questions
- anchor papers used by evaluators to distinguish between rubric scores

NOTE: The Applied Skills operational questions are released at the end of each test administration. It is important to keep in mind that a significant portion of a student's score is calculated from the Multiple-Choice section of the assessment, which is not addressed within this document.

QUESTION TYPES

This document addresses the Applied Skills section of *ISTEP+*, which allows students to demonstrate their understanding of content in a variety of ways. The Applied Skills Assessment consists of constructed-response (CR) and extended-response (ER) questions. CR and ER questions are cognitively more demanding than multiple-choice (MC) questions. ER questions are typically more complex and will likely require more steps to respond.

SCORING

For the Applied Skills Assessment, each question is scored according to a rubric. Rubrics clearly define the requirements for each score point. Each student response is evaluated individually to determine whether it is acceptable. This allows student scores to be reported as accurately as possible. To ensure consistency when scoring the *ISTEP+* questions, CTB/McGraw-Hill works closely with assessment specialists at the Indiana Department of Education and teacher committees to set guidelines for scoring student responses. Committees look at several student papers and score them using the rubrics. Some of the student responses are selected as anchor papers and are used as clear examples of specific score points. Samples of anchor papers are presented within this document. Scoring supervisors then use anchor papers and approved, scored student responses to ensure that responses are evaluated appropriately and consistently. Individuals who evaluate and score *ISTEP+* student responses must have a four-year college degree and pass a series of qualifying tests on specific questions before they can evaluate any student responses.

If a response is unscorable, it is assigned one of the following condition codes:

- **A** Blank/No Response/Refusal
- **B** Illegible
- **C** Written predominantly in a language other than English
- **D** Insufficient response/Copied from text

For additional information regarding *ISTEP+* or other student assessments, please contact the Indiana Department of Education by calling 317-232-9050 or writing via email: istep@doe.in.gov.

The chart below summarizes the question types used to measure a student's mastery of content, the assessment that contains the particular question type, the standards assessed in each assessment, and the scoring method used to evaluate a student's response given the question type.

Scoring Note: All student responses to questions found in each Applied Skills Assessment are handscored using the specific rubric(s) outlined in the column labeled "Scoring Method." As indicated in the chart, all multiple-choice questions are machine scored.

Question Type	Assessment	Standards Assessed	Scoring Method
Constructed-Response (CR)	Applied Skills Assessment	1,2,3,5,7	4-pt. CR Rubric (2-pts. Content and 2-pts. Problem Solving)
Extended-Response (ER)	Applied Skills Assessment	1,2,3,5,7	6-pt. ER Rubric (3-pts. Content and 3-pts. Problem Solving)
Multiple-Choice (MC)	Multiple-Choice Assessment	All	Machine-Scored

More information is available regarding these assessment topics on the Office of Student Assessment homepage at http://www.doe.in.gov/assessment.

Constructed-Response Rubric

Content Rubric	
2	A score of two indicates a **thorough understanding** of the mathematical concepts embodied in the task. The response • shows algorithms, computations, and other content related work executed correctly and completely.
1	A score of one indicates a **partial understanding** of the mathematical concepts embodied in the task. The response • contains errors in the execution of algorithms, computations, and/or other content related work.
0	A score of zero indicates **limited or no understanding** of the mathematical concepts embodied in the task.
Problem-Solving Rubric	
2	A score of two indicates a **thorough understanding** of the problem-solving concepts embodied in the task. The response • shows an appropriate strategy to solve the problem, and the strategy is executed correctly and completely. • identifies all important elements of the problem and shows a complete understanding of the relationships among them. • provides clear and complete explanations and/or interpretations when required.
1	A score of one indicates a **partial understanding** of the problem-solving concepts embodied in the task. The response contains one or more of the following errors. The response • shows an appropriate strategy to solve the problem. However, the execution of the strategy contains errors and/or is incomplete. • identifies some of the important elements of the problem and shows a general understanding of the relationships among them. • provides incomplete, partial, or unclear explanations and/or interpretations when required.
0	A score of zero indicates **limited or no understanding** of the problem-solving concepts embodied in the task.

Clarification and Implementation Guidance

- Correct answers ONLY, on all parts of the problem with no work shown, will receive a maximum of 1 point in content and a maximum of 1 point in Problem Solving.
- A student can receive the top score point in Problem Solving if the strategy used would result in a correct answer even though the response contains computation errors.
- A student can receive the top score point in Problem Solving if an error made in the “content” portion is used with an appropriate strategy to solve the problem.

Extended-Response Rubric

Content Rubric	
3	A score of three indicates a **thorough understanding** of the mathematical concepts embodied in the task. The response • shows algorithms, computations, and other content related work executed correctly and completely.
2	A score of two indicates a **partial understanding** of the mathematical concepts embodied in the task. The response • shows an attempt to execute algorithms, computations, and other content related work correctly and completely; computation errors or other minor errors in the content related work may be present.
1	A score of one indicates a **limited understanding** of the mathematical concepts embodied in the task. The response • contains major errors, or only a partial process. • contains algorithms, computations, and other content related work which may only be partially correct.
0	A score of zero indicates **no understanding** of the mathematical concepts embodied in the task.
Problem-Solving Rubric	
3	A score of three indicates a **thorough understanding** of the problem-solving concepts embodied in the task. The response • shows an appropriate strategy to solve the problem, and the strategy is executed correctly and completely. • identifies all important elements of the problem and shows a complete understanding of the relationships among them. • provides clear and complete explanations and/or interpretations when required.
2	A score of two indicates a **partial understanding** of the problem-solving concepts embodied in the task. The response contains one or more of the following errors. The response • shows an appropriate strategy to solve the problem. However, the execution of the strategy lacks an essential element. • identifies some of the important elements of the problem and shows a general understanding of the relationships among them. • provides incomplete or unclear explanations and/or interpretations when required.
1	A score of one indicates a **limited understanding** of the problem-solving concepts embodied in the task. The response contains one or more of the following errors. The response • shows an appropriate strategy to solve the problem. However, the execution of the strategy is applied incorrectly and/or is incomplete. • shows a limited understanding of the relationships among the elements of the problem. • provides incomplete, unclear, or omitted explanations and/or interpretations when required.
0	A score of zero indicates **no understanding** of the problem-solving concepts embodied in the task.

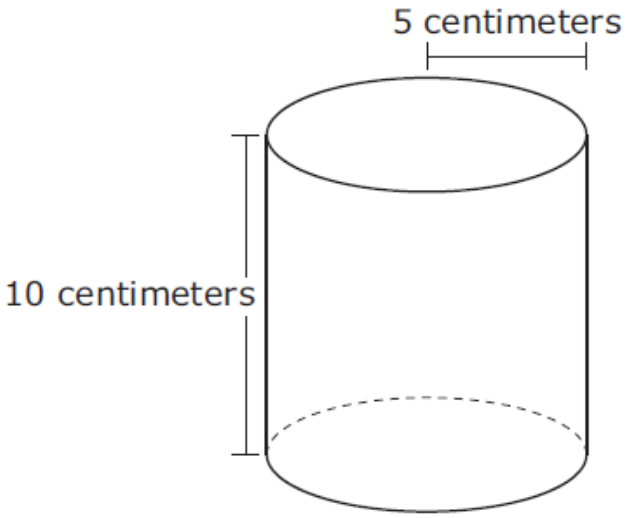
Clarification and Implementation Guidance

- Correct answers ONLY, on all parts of the problem with no work shown, will receive a maximum of 2 points in content and a maximum of 2 points in Problem Solving.
- A student can receive the top score point in Problem Solving if the strategy used would result in a correct answer even though the response contains computation errors.
- A student can receive the top score point in Problem Solving if an error made in the "content" portion is used with an appropriate strategy to solve the problem.

Constructed-Response
Standard 5: Measurement
Standard 7: Problem Solving

Question 1

Becky needs to transfer liquid to a vase using the cylindrical container, with a radius of 5 centimeters and a height of 10 centimeters, shown in the diagram below.



- Becky will fill the vase to 75% capacity.
- The vase has a volume of 2,800 cubic centimeters.
- Becky will completely fill the container each time it is used to fill the vase.

How many times will Becky need to fill the container to fill the vase to 75% capacity? Use 3.14 for π.

Show All Work

Answer _____

Exemplary Response:

- 3

Sample Process:

$V = \pi r^2 h$
V = 3.14 x 5 x 5 x 10
V = 785 cubic centimeters

2,800 x 0.75 = 2,100 cubic centimeters
2,100/785 ≈ 2.68

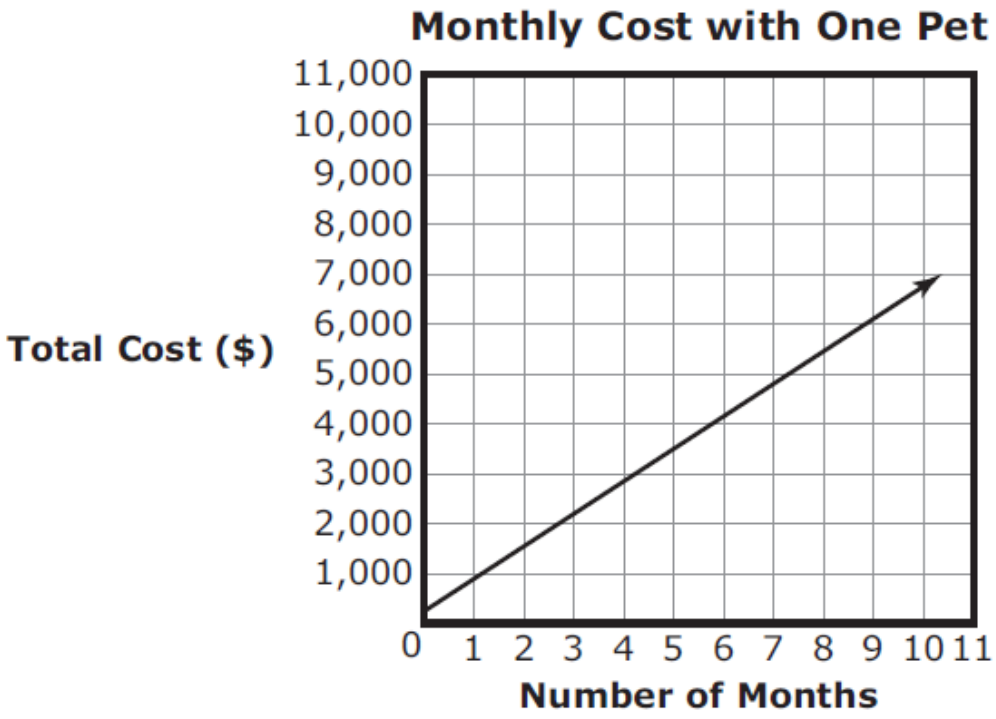
OR

Other valid process

Constructed-Response
Standard 3: Algebra and Functions
Standard 7: Problem Solving

Question 2

The graph below shows the total cost, y, to live at the West Apartments with 1 pet for x number of months.



The apartment charges $650 each month and a one-time fee of $250 for each pet.

Write an equation that can be used to determine the total cost, y, for a person with 1 pet to live at the West Apartments for x months.

Equation _____

Complete the table below to determine the total cost for a person with 1 pet to live at the West Apartments for the given number of months.

Show All Work

Number of Months	Total Cost ($)
6	
12	
18	
24	

Exemplary Response:

- $y = 650x + 250$
  OR
- Other valid equation

AND

Number of Months	Total Cost ($)
6	$4,150
12	$8,050
18	$11,950
24	$15,850

Sample Process:

6 x 650 + 250 = 4,150
12 x 650 + 250 = 8,050
18 x 650 + 250 = 11,950
24 x 650 + 250 = 15,850

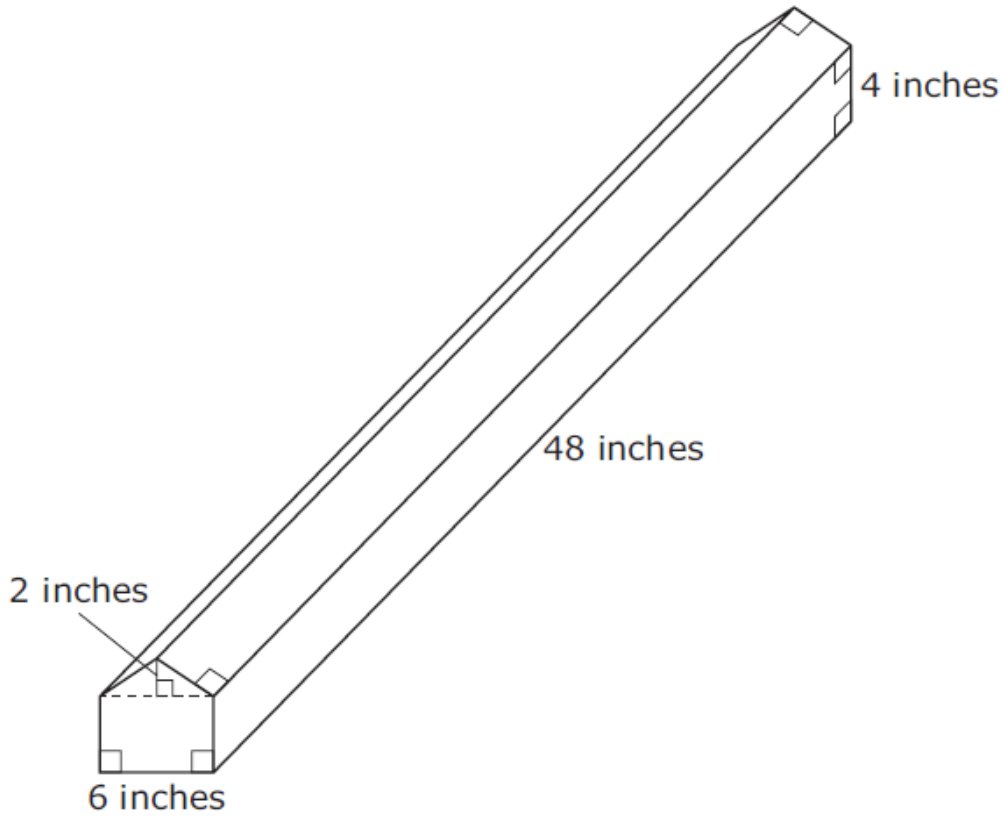
OR

Other valid process

Constructed-Response
Standard 5: Measurement
Standard 7: Problem Solving

Question 3

A store is buying concrete blocks for its parking lot. A diagram of a block is shown below.



What is the volume, in cubic inches, of one block?

Show All Work

Answer _____ cubic inches

The store is charged $3 for every 360 cubic inches of concrete used to make the block.

What is the cost of concrete for one block? Do NOT include tax.

Show All Work

Answer $ _____

Exemplary Response:

- 1,440 cubic inches

AND

- $12

Sample Process:

$V = lwh$
V = 6 x 4 x 48
V = 1,152 cubic inches

$V = Bh$
V = ½ x 6 x 2 x 48
V = 288 cubic inches

1,152 + 288 = 1,440 cubic inches

1,440/360 = 4
4 x $3 = $12

OR

Other valid process

Extended-Response
Standard 3: Algebra and Functions
Standard 7: Problem Solving

Question 4

Emilio is remodeling his bathroom. He has already spent $600 on the remodel. He needs to buy 150 tiles for the floor and cannot spend more than $1,500 on the entire bathroom.

On the line below, write an inequality that can be used to determine the maximum amount of money, m, Emilio can spend per tile and stay within his budget.

Inequality _____

What is the maximum amount of money that Emilio can spend per tile and stay within his budget? Do NOT include tax.

Show All Work

Answer $ _____ per tile

Emilio buys a sink and a countertop. The sink and countertop cost $\frac{1}{2}$ of what Emilio has remaining in his budget.

If Emilio spends only $2.50 per tile, how much money will he have left in his budget? Do NOT include tax.

Show All Work

Answer $_____

Exemplary Response:

- $150m + 600 \leq 1{,}500$
  OR
- Other valid inequality

AND

- $6 per tile

AND

- $75

Sample Process:

$150m + 600 \leq \$1{,}500$
$150m \leq \$900$
$m \leq \$6$ per tile

$900 \times 0.5 = 450$
$2.50 \times 150 = \$375$

$450 - 375 = 75$

OR

Other valid process